9. AITHW - Algorithm Integration & Test HWCI

The Algorithm Integration & Test (AI&T) HWCI (AITHW) provides hardware resources to support the integration and test of science software at the DAAC, and system level validation, integration and test. It is important to note that this HWCI provides workstations and tools for software integration and test, but does not provide the compute environment or compute capacity required for science software test. This integration and test compute capacity is included in the Science Processing HWCI (SPRHW).

9.1 AITHW Requirements Analysis

The requirements for AITHW are based upon the need to have a software development, configuration management, and test environment at the DAAC to support the integration and test of science software delivered to the DAAC by the instrument teams. Note that the ORNL and ASF DAACs do not perform science processing within ECS and therefore do not have AITHW components.

The AI&T activity is expected to be characterized by intense activity at certain program milestones (the initial delivery of science software, for instance) and a much lower level of activity on an ongoing basis. There are no explicit ECS requirements identifying capacity, throughput, or response time requirements for AITHW; therefore, the sizing of the hardware has been based upon the size of the integration and test effort anticipated for each instrument and upon experience with the ECS Ir-1 release.

The number of AI&T seats provided at each DAAC has been specified by allocating two seats for each instrument supported at the DAAC. In this calculation, CERES TRMM and CERES AM-1 at LaRC are counted separately, and MODIS at GSFC is counted as three instruments, one for each MODIS subsystem (land, ocean, and atmosphere). The number of AI&T stations must be scalable to provide surge capacity during especially busy periods. The AI&T stations must provide the capability to support the AI&T tools, which provide graphical user interfaces. The AI&T stations do not have stringent reliability, maintainability, availability, and backup requirements, as they do not directly support production processing. The AI&T stations must be compatible with and interoperable with the target SPRHW hardware and the AI&T tools server.

The AI&T tools server must provide sufficient capacity to support the use of the development, configuration management, and test tools by the AI&T stations. Because the maximum number of AI&T stations at a DAAC will be ten, and the tools server is not also acting as the software build or test environment (which is provided by SPRHW), the AI&T server requirements are minimal. The AI&T tools server does not have stringent reliability, maintainability, availability, and backup requirements, as it does not directly support production processing. The AI&T tool server must be compatible with the AI&T stations and the target SPRHW hardware.

AITHW must provide a network printing capability to support the AI&T task.

9.2 AITHW Technology Assessment

The AI&T hardware requirements do not present any significant technical challenges, and therefore no special technology assessment efforts (prototyping, benchmarking, or product evaluations) have been performed to support the specification of AITHW.

Because the CPU resources required for AI&T will be provided by target machines in the SPRHW suite, or by the AI&T tools server, the AI&T station requirements can be met with X-Terminals. The use of X-Terminals for these stations has several advantages, including cost effectiveness, ease of maintenance, scalability, and compatibility.

9.3 AITHW Specification

The AI&T hardware suite at a DAAC will consist of from two to ten X-Terminals, one server, and one network printer. These components will be connected to ECS via the ECS local area network at the DAAC.

DAAC-specific details about the AITHW specification can be found in the ECS Design Specifications for the DAACs:

A. GSFC: DID-CD-305-030-002;

B. LaRC: DID-CD-305-031-002;

C. EDC: DID-CD-305-033-002;

D. NSIDC: DID-CD-305-035-002; and

E. JPL: DID-CD-305-036-002.

9.3.1 AITHW Components

The AITHW components will consist of workstations, a tools server, and a network printer.

9.3.1.1 AITHW Workstations

The requirements for AITHW workstations will be met at minimum cost by providing NCD HMX-PRO X-Terminals. These X-Terminals will be configured with 20" color monitors and 16 megabytes of memory to support the use of the tools specified for the AI&T tools server. Users will log on to either the AI&T tools server to use its software, or to a target machine in the SPRHW suite to build and test software in that environment.

The X-Terminals will be configured to allow the addition of memory if experience indicates this is necessary; experience with Ir-1 resulted in upgrades to the memory of X-Terminals purchased for Ir-1. Additional X-Terminals can be purchased and integrated quickly and easily if expansion of the AI&T seating capacity at a DAAC becomes a critical requirement. Other ECS operations workstations, such as those in the Algorithm Quality Assurance HWCI and the Planning Subsystem HWCI, can also be used to support short term increases in AI&T activity.

Note that some DAACs received Sun workstations (Sun SPARC 20/50s) for use as AI&T workstations in Release A. These workstations will be replaced by X-Terminals, and will be re-used elsewhere in the ECS DAACs.

9.3.1.2 AITHW Server

The requirements for an AITHW tools server can be met by providing a minimal compute facility with local storage for AI&T data products and databases. A Sun Ultra 1 Model 140 has been selected for this function. Because the Sybase Relational Database Management System (RDBMS) will be used to support AI&T, the memory of the server will be upgraded to 128 MB, and two two gigabyte internal disks will be used to provide local storage. Backup and restore for the AI&T tools server will be provided over the network by the enterprise backup server within MSS. The AI&T tools server will be equipped with a CD-ROM for loading new operating system and commercial tools software.

9.3.1.3 AITHW Network Printer

The AITHW network printing requirement will be satisfied by providing an HP LaserJet 4M+ with 14 megabytes of RAM. This printer has 12 page per minute throughput.

9.3.2 AITHW Interfaces

The AITHW components will reside on the ECS PDPS FDDI network. This network will provide direct access between AITHW components and the SPRHW suite. The AITHW components may also communicate with other ECS components and the external world via the DAAC FDDI switch.

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